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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,093	04/11/2001	Shigeo Ishikawa	Q64059	8684

7590 02/13/2003

SUGHRUE, MION, ZINN, MACPEAK & SEAS
2100 Pennsylvania Avenue, N.W.
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EXAMINER
NGUYEN, KHIEM D

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 02/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/832,093	ISHIKAWA, SHIGEO	
	Examiner	Art Unit	
	Khiem D Nguyen	2823	

-- The MAILING DATE of this communication app ars on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

A new rejection is made as set forth in this Office Action.

Claims (1-14) are pending in the application.

Drawings

The drawings are objected to because in Fig. 1C "Ar GAS (PIPES 1, 6" should be change to "Ar GAS (PIPES 3, 6)". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-14 are rejected under 3 5 U. S. C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) of this application in view of Gupta et al. (U.S. Patent 6,121,163) and Li et al. (U.S. Patent 5,772,771).

AAPA disclose a method of forming a film comprising the steps of (See Description of the Related Art on pages 1-4 of this application and FIGS. 2A-E and 5):

starting a supply of a reaction gas comprising one of SiH_4, SiF_4 or TEOS (page 1, line 21) at a first flow rate into a chamber in which a plasma is formed, such that an initial film is formed on a wafer (FIG. 2A); and

starting a supply of the reaction gas at a second flow rate into the chamber in which the plasma is formed while the supply of the reaction gas at the first flow rate continues such that the film is formed on the initial film wherein the first flow rate being smaller than the second flow rate (FIG. 2B) and wherein the first flow rate is in a range of one fifth to one tenth of the second flow rate (page 2, lines 19-22).

AAPA discloses supplying the reaction gas at a second flow rate into the chamber while the supply of the reaction gas at the first flow rate continues (FIG. 2A-B) but fails to disclose supplying the reaction gas at a second flow rate into the chamber in which the plasma is formed after supplying the reaction gas at a first flow rate while the supply of the reaction gas at the first flow rate continues such that the film is formed on the initial film as recited in present claims 1 and 8.

Gupta discloses (FIGS. 1-6A-B and related text) a method of forming a film by supplying a reaction gas at a first flow rate into a chamber in which a plasma is formed, such that an initial film is formed on a wafer (claim 1); and

supplying the reaction gas at a second flow rate into the chamber in which the plasma is formed after supplying the reaction gas at a first flow rate while the supply of the reaction gas at the first flow rate continues (claim 10) such that the film is formed on the initial film (claim 1) wherein the reaction gas comprising one of SiH_4, SiF_4 or TEOS (col. 7, lines 14 and claims 6 and 24) and wherein the first flow rate being smaller than

the second flow rate (claim 10). Gupta also discloses wherein the reaction gas of one flow rate is initiated between 1-10 seconds after the reaction gas of the other flow rate (claim 25). It would have been obvious to one of ordinary skill at the time of the invention to combine the teaching of the AAPA and Gupta to enable the film of the AAPA to be formed and further more to obtain a layer having improved film quality at an interface (Abstract).

Neither the AAPA nor Gupta discloses a chamber wherein a first nozzle is provided on the chamber above a center region of the wafer and wherein second nozzles are provided on the sidewalls of the chamber above the same wafer as recited in present claims 6 and 7.

Li discloses in figures 1-5 and related text a chamber wherein a first nozzle (figure 1, 56) is provided on the chamber above a center region of the wafer (figure 1, 20) and wherein second nozzles (figure 1, 34) are provided on the sidewalls of the chamber above the same wafer. It would have been obvious to one of ordinary skill at the time of the invention to combine the teachings of the AAPA, Gupta and Li to enable the process of supplying the reaction gas at the first flow rate into the chamber via a first nozzle and supplying the reaction gas at the second flow rate into the chamber via second nozzles of the AAPA to be performed and further more to improve deposition thickness uniformity (Abstract).

None of the references explicitly discloses wherein a thickness of the film is equal to or thinner than 10 nm as recited in present claim 8.

However, the selection of the film thickness is obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species. In re Jones, 162 USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA 1980)(discovery of optimum value of result effective variable in a known process is obvious).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaudhuri Olik can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
February 7, 2003

George Fourson
Primary Examiner
2823